

CLAIMS:

What is claimed is:

1. A cleaning system for automatically cleaning a shower comprising:  
a cleaning solution reservoir configured to hold a cleaning solution;  
a fluid dispensing device configured to automatically dispense said  
cleaning solution within said shower;  
a pumping system coupled to said cleaning solution reservoir and  
configured to supply said cleaning solution from said cleaning solution  
reservoir to said fluid dispensing device; and  
a power source coupled to said pumping system, and configured to  
provide said pumping system with power for supplying said cleaning solution.
2. The cleaning system of claim 1, further comprising:  
a control system coupled to said pumping system, and configured to  
operate said pumping system according to a cleaning recipe, wherein said  
power source is further coupled to said control system and configured to  
provide said control system with power for performing said cleaning recipe.
3. The cleaning system of claim 2, further comprising:  
a pressure measurement device coupled to said outlet of said pumping  
system, and configured to measure a pressure of said cleaning solution.
4. The cleaning system of claim 3, wherein said cleaning recipe  
includes a target pressure, and said control system is configured to control  
said pumping system in order to minimize a difference between said  
measured pressure of said cleaning solution and said target pressure.
5. The cleaning system of claim 2, wherein said control system is  
further coupled to said fluid dispensing device, and is configured to operate  
said cleaning solution device according to said cleaning recipe.
6. The cleaning system of claim 5, further comprising:

means for measuring a position of said fluid dispensing device coupled to said control system.

7. The cleaning system of claim 6, wherein said cleaning recipe includes a target position for said fluid dispensing device, and said control system is configured to control said fluid dispensing device in order to minimize a difference between said measured position of said fluid dispensing device and said target position.

8. The cleaning system of claim 5, further comprising:  
means for measuring a rate of translation of said fluid dispensing device coupled to said control system.

9. The cleaning system of claim 8, wherein said cleaning recipe includes a target rate of translation for said fluid dispensing device, and said control system is configured to control said fluid dispensing device in order to minimize a difference between said measured rate of translation of said fluid dispensing device and said target rate of translation.

10. The cleaning system of claim 5, further comprising:  
means for measuring a rate of rotation of said fluid dispensing device coupled to said control system.

11. The cleaning system of claim 10, wherein said cleaning recipe includes a target rate of rotation for said fluid dispensing device, and said control system is configured to control said fluid dispensing device in order to minimize a difference between said measured rate of rotation of said fluid dispensing device and said target rate of rotation.

12. The cleaning system of claim 2, further comprising:  
a detection system coupled to said control system, and configured to perform at least one of determining whether a person is within said shower, determining whether or not a door coupled to said shower is open or closed,

determining a status of said fluid dispensing device, determining a status of said pumping system, and determining a status of said power source.

13. The cleaning system of claim 2, wherein said cleaning recipe is configured for a size of said shower.

14. The cleaning system of claim 1, further comprising:  
an enclosure configured to seal said cleaning solution reservoir, said pumping system, and said power system from the environment in said shower, wherein said fluid dispensing device is coupled to said enclosure.

15. The cleaning system of claim 2, further comprising:  
an enclosure configured to seal said cleaning solution reservoir, said pumping system, said power system, and said control system from the environment in said shower, wherein said fluid dispensing device is coupled to said enclosure.

16. The cleaning system of claim 15, wherein said fluid dispensing device comprises a spray column arm coupled to said enclosure, and a multi-directional spray column coupled to said spray column arm, said spray column arm configured to translate said multi-directional spray column in said shower and said multi-directional spray column configured to rotate about a longitudinal axis and dispense at least one of said cleaning solution, and a rinsing solution.

17. The cleaning system of claim 16, wherein said multi-directional spray column comprises one or more spray nozzles configured to inject at least one of said cleaning solution and said rinsing solution into said shower.

18. The cleaning system of claim 17, wherein said one or more spray nozzles are unequally spaced along said multi-directional spray column.

19. The cleaning system of claim 17, wherein said one or more spray nozzles are each angled differently with respect to said longitudinal axis.

20. The cleaning system of claim 17, wherein the orientation of said one or more spray nozzles on said multi-directional spray column substantially minimizes overlap of the spray of said cleaning solution.
21. The cleaning system of claim 17, wherein the orientation of said one or more spray nozzles on said multi-directional spray column substantially maximizes the coverage of said cleaning solution in said shower.
22. The cleaning system of claim 17, wherein at least one of said one or more spray nozzles is adjustable.
23. The cleaning system of claim 17, wherein said multi-directional spray column comprises a filter configured to remove particles from said cleaning solution.
24. The cleaning system of claim 16, wherein said spray column arm comprises a telescoping spray column arm.
25. The cleaning system of claim 1, wherein an inlet of said pumping system is coupled to said cleaning solution reservoir via a first fluid supply line, and an outlet of said pumping system is coupled to said fluid dispensing device via a second fluid supply line.
26. The cleaning system of claim 1, wherein said fluid dispensing device is at least one of stationary, and non-stationary.
27. The cleaning system of claim 2, wherein said control system is configured to provide at least one of an optical signal and an acoustic signal to alert an operator to a cleaning system operation.
28. The cleaning system of claim 27, wherein said acoustic signal comprises at least one of a tone, series of tones, and vocal message.

29. The cleaning system of claim 27, wherein said optical signal includes a light signal generated by a light emitting diode (LED).

30. The cleaning system of claim 1, wherein said pumping system is configured to reverse the flow of said cleaning solution, and return said cleaning solution in said fluid dispensing device to said cleaning solution reservoir.

31. The cleaning system of claim 1, wherein said cleaning solution reservoir comprises a cap assembly configured to extract said cleaning solution from the bottom of said cleaning solution reservoir when said pumping system provides a forward flow of said cleaning solution to said cleaning system dispensing device, and to deposit said cleaning solution in the top of said cleaning solution reservoir when said pumping system provides a reverse flow of said cleaning solution from said fluid dispensing device.

32. The cleaning system of claim 2, further comprising:  
a control interface coupled to said control system and configured to provide a user access to operating said cleaning system, wherein said control interface comprises at least one of a local control interface physically coupled to said control system and a remote control interface remotely coupled to said control system.

33. The cleaning system of claim 25, wherein said remote control interface comprises a radio frequency (RF) transmitter, a RF receiver, and a battery configured to provide power to said RF transmitter and said RF receiver.

34. The cleaning system of claim 33, wherein said control system further comprises a wireless connection to a home personal computer, said control system configured to use at least one software program on said home personal computer to alert an operator to replace said battery in said remote control interface.

35. The cleaning system of claim 2, wherein said cleaning system further comprises a door switch coupled to said control system, and configured to provide said control system with a status of said shower door.

36. The cleaning system of claim 34, wherein said door switch comprises a wireless door switch.

37. The cleaning system of claim 36, wherein said wireless door switch comprises a radio frequency (RF) transmitter, and a battery configured to provide power to said RF transmitter.

38. The cleaning system of claim 37, wherein said control system further comprises a wireless connection to a home personal computer, said control system is configured to use at least one software program on said home personal computer to alert an operator to replace said battery in said wireless door switch.

39. The cleaning system of claim 2, wherein said control system is configured to monitor a status of said cleaning solution reservoir by monitoring at least one of a fluid height of said cleaning solution in said cleaning solution reservoir, and a weight of said cleaning solution reservoir.

40. The cleaning system of claim 39, wherein said cleaning system further comprises a pressure transducer coupled to said cleaning solution reservoir and said control system, and configured to measure said weight of said cleaning solution reservoir and provide said weight to said control system.

41. The cleaning system of claim 39, wherein said control system further comprises a wireless connection to a home personal computer, said control system is configured to use at least one software program on said home personal computer to alert an operator to replace said cleaning solution in said cleaning solution reservoir.

42. A method of automatically cleaning a shower using a cleaning system comprising:

initiating an automatic cleaning process configured to be performed by said cleaning system, wherein said cleaning system comprises a cleaning solution reservoir configured to store a cleaning solution, a fluid dispensing device configured for dispensing said cleaning solution in said shower, a pumping system coupled to said cleaning solution reservoir and configured to supply said cleaning solution from said cleaning solution reservoir to said fluid dispensing device, and a power source coupled to said pumping system and configured to provide said pumping system with power for supplying said cleaning solution;

dispensing said cleaning solution in said shower; and  
terminating said automatic cleaning process.

43. The method of claim 42, wherein said initiating said cleaning process includes activating said pumping system in order to provide a forward flow of said cleaning solution from said cleaning solution reservoir to said fluid dispensing device.

44. The method of claim 42, wherein said initiating said cleaning process includes translating said fluid dispensing device to a cleaning position.

45. The method of claim 44, wherein said translating said fluid dispensing device comprises rotating a spray column arm and a multi-directional spray column to said cleaning position, said spray column arm having a first end coupled to said cleaning solution reservoir through an enclosure configured to seal said cleaning solution reservoir, said pumping system, and said power source from said shower, and a second end coupled to a top end of said multi-directional spray column, wherein said rotation is performed about said first end of said spray column arm.

46. The method of claim 45, wherein said dispensing said cleaning solution in said shower comprises rotating said multi-directional spray column

about said top end, and injecting said cleaning solution into said shower through one or more spray nozzles positioned between said top end of said multi-directional spray column and a bottom end of said multi-directional spray column.

47. The method of claim 46, further comprising:

controlling said cleaning system during said cleaning process according to a cleaning recipe using a control system coupled to said pumping system and said fluid dispensing device.

48. The method of claim 47, wherein said controlling said cleaning system includes performing at least one of controlling a pressure of said cleaning solution at said outlet of said pumping system, controlling a position of said spray column arm, and controlling a rate of rotation of said multi-directional spray column.

49. The method of claim 42, further comprising:

controlling said cleaning system during said cleaning process according to a cleaning recipe using a control system coupled to said pumping system and said fluid dispensing device.

50. The method of claim 49, wherein said controlling said cleaning system includes controlling a pressure of said cleaning solution at said outlet of said pumping system.

51. The method claim 49, further comprising:

performing a pre-start condition validation for said cleaning system, wherein said control system alerts a user to an invalid status for said cleaning system.

52. The method of claim 49, further comprising:

alerting a user to the initiation of said cleaning process.

53. The method of claim 49, further comprising:

determining a status of a shower door coupled to said shower; and terminating said cleaning process if said shower door is open.

54. The method of claim 49, further comprising:  
determining a status of said shower; and  
terminating said cleaning process if a person occupies said shower.

55. The method of claim 42, wherein said terminating said cleaning process comprises deactivating said pumping system.

56. The method of claim 42, wherein said terminating said cleaning process comprises providing a reverse flow of said cleaning solution from said fluid dispensing device to said cleaning solution reservoir through said pumping system, and deactivating said pumping system.

57. The method of claim 42, further comprising:  
alerting a user to a completion of said cleaning process.

58. The method of claim 42, further comprising:  
alerting a user to refill said cleaning solution in said cleaning solution reservoir.

59. A cleaning system for automatically cleaning a shower comprising:  
a cleaning solution reservoir configured to hold a cleaning solution;  
a fluid dispensing device configured to automatically dispense said cleaning solution within said shower;  
a pumping system coupled to said cleaning solution reservoir and configured to supply said cleaning solution from said cleaning solution reservoir to said fluid dispensing device;  
a control system coupled to said pumping system, and configured to operate said pumping system according to a cleaning recipe; and  
a power source coupled to said pumping system and said control system, and configured to provide said pumping system and said control system with power for performing said cleaning recipe.

60. The cleaning system of claim 59, wherein said fluid dispensing device comprises a spray column arm, and a multi-directional spray column coupled to said spray column arm, said spray column arm configured to translate said multi-directional spray column in said shower and said multi-directional spray column configured to rotate about a longitudinal axis and dispense at least one of said cleaning solution, and a rinsing solution.